

## CLAIMS

What is claimed is:

- 1 1. A method of automatically generating a configuration for a network device, the  
2 method comprising the computer-implemented steps of:  
3 receiving a partial configuration for a network device, wherein the partial  
4 configuration comprises a plurality of configuration commands, wherein each  
5 of one or more of the configuration commands is associated with one of a  
6 plurality of user interface elements;  
7 parsing the partial configuration to identify the user interface elements;  
8 generating a user interface page based on the user interface elements;  
9 receiving one or more configuration parameter values via the user interface page; and  
10 substituting the configuration parameter values into the partial configuration to result  
11 in creating a complete configuration for the device.
- 1 2. A method as recited in Claim 1, wherein the partial configuration is stored in non-  
2 volatile memory of the network device prior to shipment of the network device to a user.
- 1 3. A method as recited in Claim 1, wherein the partial configuration comprises an  
2 electronic configuration template that is stored in non-volatile memory of the network device  
3 prior to shipment of the network device from a service provider or vendor to a user.
- 1 4. A method as recited in Claim 1, wherein the network device comprises a customer  
2 premises equipment (CPE) device.
- 1 5. A method as recited in Claim 1, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value.

1 6. A method as recited in Claim 5, wherein the user interface string value comprises a  
2 sequence of characters for display in the user interface page as part of a prompt for entering  
3 an associated configuration parameter value.

1 7. A method as recited in Claim 5, wherein the data type value specifies a data type  
2 associated with the user interface element for use in determining validity of the received  
3 configuration parameter values.

1 8. A method as recited in Claim 7, wherein the data type value is selected from among a  
2 set consisting of IP address, subnet mask, dial pattern, virtual channel identifier, virtual path  
3 identifier, username, password, gateway, hostname, group name, group key, and peer IP  
4 address.

1 9. A method as recited in Claim 1, wherein the partial configuration further comprises  
2 one or more dynamic tags that are not associated with user interface elements, and wherein  
3 the method further comprises the steps of:

4 parsing the partial configuration to identify the dynamic tags;  
5 substituting a configuration parameter value for each of the dynamic tags as part of  
6 the complete configuration.

1 10. A method as recited in Claim 1, wherein each of the user interface elements  
2 comprises a user interface string value, and wherein the step of generating a user interface  
3 page comprises the steps of:

4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value; and  
7 causing the network device to display the electronic document using the end user  
8 computer system.

1 11. A method as recited in Claim 1, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value, and  
3 wherein the method further comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value;  
7 causing the network device to display the electronic document using the end user  
8 computer system;  
9 associating one of the configuration parameter values with the data variable name;  
10 and  
11 determining whether a data type of the one of the configuration parameter values  
12 matches the data type value.

1 12. A method of automatically generating a network device configuration, the method  
2 comprising the computer-implemented steps of:  
3 reading a configuration template from non-volatile memory of a network device,  
4 wherein the configuration template comprises a plurality of configuration  
5 commands, wherein each of one or more of the configuration commands is  
6 associated with one of a plurality of user interface elements, wherein the  
7 configuration template is stored in the memory prior to movement of the  
8 network device from a vendor or service provider to a user;  
9 parsing the configuration template to identify one or more user interface elements;  
10 generating a user interface page based on the user interface elements;  
11 receiving one or more configuration parameter values from a user of the network  
12 device via the user interface page; and  
13 substituting the configuration parameter values into the configuration template in  
14 association with the configuration commands to result in creating and storing  
15 a complete configuration for the device.

1 13. A method as recited in Claim 12, wherein the network device comprises a customer  
2 premises equipment (CPE) device.

1 14. A method as recited in Claim 12, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, a data type value, and a settings  
3 type value.

1 15. A method as recited in Claim 14, wherein the user interface string value comprises a  
2 sequence of characters for display in the user interface page as part of a prompt for entering  
3 an associated configuration parameter value.

1 16. A method as recited in Claim 14, wherein the data type value specifies a data type  
2 associated with the user interface element for use in determining validity of the received  
3 configuration parameter values.

1 17. A method as recited in Claim 16, wherein the data type value is selected from among  
2 a set consisting of IP address, subnet mask, dial pattern, virtual channel identifier, virtual  
3 path identifier, username, password, gateway, hostname, group name, group key, and peer IP  
4 address.

1 18. A method as recited in Claim 12, wherein the configuration template further  
2 comprises one or more dynamic tags that are not associated with user interface elements, and  
3 wherein the method further comprises the steps of:  
4 parsing the configuration template to identify the dynamic tags;  
5 substituting a configuration parameter value for each of the dynamic tags as part of  
6 the complete configuration.

1 19. A method as recited in Claim 12, wherein each of the user interface elements  
2 comprises a user interface string value, and wherein the step of generating a user interface  
3 page comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value; and  
7 causing the network device to display the electronic document using the end user  
8 computer system.

1 20. A method as recited in Claim 12, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value, and  
3 wherein the method further comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value;  
7 causing the network device to display the electronic document using the end user  
8 computer system;  
9 associating one of the configuration parameter values with the data variable name;  
10 and  
11 determining whether a data type of the one of the configuration parameter values  
12 matches the data type value.

1 21. A computer-readable medium carrying one or more sequences of instructions for  
2 automatically generating a configuration for a network device, which instructions, when  
3 executed by one or more processors, cause the one or more processors to carry out the steps  
4 of:  
5 receiving a partial configuration for a network device, wherein the partial  
6 configuration comprises a plurality of configuration commands, wherein each  
7 of one or more of the configuration commands is associated with one of a  
8 plurality of user interface elements;

9 parsing the partial configuration to identify the user interface elements;  
10 generating a user interface page based on the user interface elements;  
11 receiving one or more configuration parameter values via the user interface page; and  
12 substituting the configuration parameter values into the partial configuration to result  
13 in creating a complete configuration for the device.

1 22. A computer-readable medium as recited in Claim 21, wherein the partial  
2 configuration is stored in non-volatile memory of the network device prior to shipment of the  
3 network device to a user.

1 23. A computer-readable medium as recited in Claim 21, wherein the partial  
2 configuration comprises an electronic configuration template that is stored in non-volatile  
3 memory of the network device prior to shipment of the network device from a service  
4 provider or vendor to a user.

1 24. A computer-readable medium as recited in Claim 21, wherein the network device  
2 comprises a customer premises equipment (CPE) device.

1 25. A computer-readable medium as recited in Claim 21, wherein each of the user  
2 interface elements comprises a data variable name, a user interface string value, and a data  
3 type value.

1 26. A computer-readable medium as recited in Claim 25, wherein the user interface string  
2 value comprises a sequence of characters for display in the user interface page as part of a  
3 prompt for entering an associated configuration parameter value.

1 27. A computer-readable medium as recited in Claim 25, wherein the data type value  
2 specifies a data type associated with the user interface element for use in determining validity  
3 of the received configuration parameter values.

1 28. A computer-readable medium as recited in Claim 27, wherein the data type value is  
2 selected from among a set consisting of IP address, subnet mask, dial pattern, virtual channel  
3 identifier, virtual path identifier, username, password, gateway, hostname, group name,  
4 group key, and peer IP address.

1 29. A computer-readable medium as recited in Claim 21, wherein the partial  
2 configuration further comprises one or more dynamic tags that are not associated with user  
3 interface elements, and wherein the method further comprises the steps of:  
4 parsing the partial configuration to identify the dynamic tags;  
5 substituting a configuration parameter value for each of the dynamic tags as part of  
6 the complete configuration.

1 30. A computer-readable medium as recited in Claim 21, wherein each of the user  
2 interface elements comprises a user interface string value, and wherein the step of generating  
3 a user interface page comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value; and  
7 causing the network device to display the electronic document using the end user  
8 computer system.

1 31. A computer-readable medium as recited in Claim 21, wherein each of the user  
2 interface elements comprises a data variable name, a user interface string value, and a data  
3 type value, and wherein the method further comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value;  
7 causing the network device to display the electronic document using the end user  
8 computer system;

9 associating one of the configuration parameter values with the data variable name;  
10 and  
11 determining whether a data type of the one of the configuration parameter values  
12 matches the data type value.

1 32. An apparatus for automatically generating a configuration for a network device,  
2 comprising:  
3 means for receiving a partial configuration for a network device, wherein the partial  
4 configuration comprises a plurality of configuration commands, wherein each  
5 of one or more of the configuration commands is associated with one of a  
6 plurality of user interface elements;  
7 means for parsing the partial configuration to identify the user interface elements;  
8 means for generating a user interface page based on the user interface elements;  
9 means for receiving one or more configuration parameter values via the user interface  
10 page; and  
11 means for substituting the configuration parameter values into the partial  
12 configuration to result in creating a complete configuration for the device.

1 33. An apparatus as recited in Claim 32, wherein the partial configuration is stored in  
2 non-volatile memory of the network device prior to shipment of the network device to a user.

1 34. An apparatus as recited in Claim 32, wherein the partial configuration comprises an  
2 electronic configuration template that is stored in non-volatile memory of the network device  
3 prior to shipment of the network device from a service provider or vendor to a user.

1 35. An apparatus as recited in Claim 32, wherein the network device comprises a  
2 customer premises equipment (CPE) device.

1 36. An apparatus as recited in Claim 32, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value.



1 37. An apparatus as recited in Claim 36, wherein the user interface string value comprises  
2 a sequence of characters for display in the user interface page as part of a prompt for entering  
3 an associated configuration parameter value.

1 38. An apparatus as recited in Claim 36, wherein the data type value specifies a data type  
2 associated with the user interface element for use in determining validity of the received  
3 configuration parameter values.

1 39. An apparatus as recited in Claim 38, wherein the data type value is selected from  
2 among a set consisting of IP address, subnet mask, dial pattern, virtual channel identifier,  
3 virtual path identifier, username, password, gateway, hostname, group name, group key, and  
4 peer IP address.

1 40. An apparatus as recited in Claim 32, wherein the partial configuration further  
2 comprises one or more dynamic tags that are not associated with user interface elements, and  
3 further comprising:  
4 means for parsing the partial configuration to identify the dynamic tags;  
5 means for substituting a configuration parameter value for each of the dynamic tags  
6 as part of the complete configuration.

1 41. An apparatus as recited in Claim 32, wherein each of the user interface elements  
2 comprises a user interface string value, and wherein the generating means comprises:  
3 means for generating an electronic document that is displayable by an end user  
4 computer system that is communicatively coupled to the network device,  
5 wherein the electronic document includes the user interface string value; and  
6 means for causing the network device to display the electronic document using the  
7 end user computer system.

1 42. An apparatus as recited in Claim 32, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value, and  
3 wherein the apparatus further comprises:  
4 means for generating an electronic document that is displayable by an end user  
5 computer system that is communicatively coupled to the network device,  
6 wherein the electronic document includes the user interface string value;  
7 means for causing the network device to display the electronic document using the  
8 end user computer system;  
9 means for associating one of the configuration parameter values with the data variable  
10 name; and  
11 means for determining whether a data type of the one of the configuration parameter  
12 values matches the data type value.

1 43. An apparatus for automatically generating a configuration for a network device,  
2 comprising:  
3 a network interface that is coupled to the data network for receiving one or more packet  
4 flows therefrom;  
5 a processor;  
6 one or more stored sequences of instructions which, when executed by the processor, cause  
7 the processor to carry out the steps of:  
8 receiving a partial configuration for a network device, wherein the partial  
9 configuration comprises a plurality of configuration commands, wherein each  
10 of one or more of the configuration commands is associated with one of a  
11 plurality of user interface elements;  
12 parsing the partial configuration to identify the user interface elements;  
13 generating a user interface page based on the user interface elements;  
14 receiving one or more configuration parameter values via the user interface page; and  
15 substituting the configuration parameter values into the partial configuration to result  
16 in creating a complete configuration for the device.

1 44. An apparatus as recited in Claim 43, wherein the partial configuration is stored in  
2 non-volatile memory of the network device prior to shipment of the network device to a user.

1 45. An apparatus as recited in Claim 43, wherein the partial configuration comprises an  
2 electronic configuration template that is stored in non-volatile memory of the network device  
3 prior to shipment of the network device from a service provider or vendor to a user.

1 46. An apparatus as recited in Claim 43, wherein the network device comprises a  
2 customer premises equipment (CPE) device.

1 47. An apparatus as recited in Claim 43, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value.

1 48. An apparatus as recited in Claim 47, wherein the user interface string value comprises  
2 a sequence of characters for display in the user interface page as part of a prompt for entering  
3 an associated configuration parameter value.

1 49. An apparatus as recited in Claim 47, wherein the data type value specifies a data type  
2 associated with the user interface element for use in determining validity of the received  
3 configuration parameter values.

1 50. An apparatus as recited in Claim 49, wherein the data type value is selected from  
2 among a set consisting of IP address, subnet mask, dial pattern, virtual channel identifier,  
3 virtual path identifier, username, password, gateway, hostname, group name, group key, and  
4 peer IP address.

1 51. An apparatus as recited in Claim 43, wherein the partial configuration further  
2 comprises one or more dynamic tags that are not associated with user interface elements, and  
3 wherein the method further comprises the steps of:  
4 parsing the partial configuration to identify the dynamic tags;  
5 substituting a configuration parameter value for each of the dynamic tags as part of  
6 the complete configuration.

1 52. An apparatus as recited in Claim 43, wherein each of the user interface elements  
2 comprises a user interface string value, and wherein the step of generating a user interface  
3 page comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value; and  
7 causing the network device to display the electronic document using the end user  
8 computer system.

1 53. An apparatus as recited in Claim 43, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value, and  
3 wherein the method further comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value;  
7 causing the network device to display the electronic document using the end user  
8 computer system;  
9 associating one of the configuration parameter values with the data variable name;  
10 and  
11 determining whether a data type of the one of the configuration parameter values  
12 matches the data type value.

1 54. A method of enabling a network service provider to customize a configuration of a  
2 network device, the method comprising the computer-implemented steps of:  
3 creating and storing a partial configuration for a network device within the network  
4 device, wherein the partial configuration comprises a plurality of  
5 configuration commands, wherein each of one or more of the configuration  
6 commands is associated with one of a plurality of user interface elements;  
7 providing the network device with the partial configuration to an end user, wherein  
8 setup of the network device causes the network device to perform the steps of  
9 parsing the partial configuration to identify the user interface elements;  
10 generating a user interface page based on the user interface elements;  
11 receiving one or more configuration parameter values via the user interface  
12 page; and substituting the configuration parameter values into the partial  
13 configuration to result in creating a complete configuration for the device.

1 55. A method as recited in Claim 54, wherein the partial configuration is stored in non-  
2 volatile memory of the network device before providing the device to the user.

1 56. A method as recited in Claim 54, wherein the partial configuration comprises an  
2 electronic configuration template that is stored in non-volatile memory of the network device  
3 prior to providing the network device from a service provider or vendor to the user.

1 57. A method as recited in Claim 54, wherein the network device comprises a customer  
2 premises equipment (CPE) device.

1 58. A method as recited in Claim 54, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value.

1 59. A method as recited in Claim 58, wherein the user interface string value comprises a  
2 sequence of characters for display in the user interface page as part of a prompt for entering  
3 an associated configuration parameter value.

1 60. A method as recited in Claim 58, wherein the data type value specifies a data type  
2 associated with the user interface element for use in determining validity of the received  
3 configuration parameter values.

1 61. A method as recited in Claim 60, wherein the data type value is selected from among  
2 a set consisting of IP address, subnet mask, dial pattern, virtual channel identifier, virtual  
3 path identifier, username, password, gateway, hostname, group name, group key, and peer IP  
4 address.

1 62. A method as recited in Claim 54, wherein the partial configuration further comprises  
2 one or more dynamic tags that are not associated with user interface elements, and wherein  
3 the method further comprises the steps of:

4 parsing the partial configuration to identify the dynamic tags;  
5 substituting a configuration parameter value for each of the dynamic tags as part of  
6 the complete configuration.

1 63. A method as recited in Claim 54, wherein each of the user interface elements  
2 comprises a user interface string value, and wherein the step of generating a user interface  
3 page comprises the steps of:

4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value; and  
7 causing the network device to display the electronic document using the end user  
8 computer system.

1 64. A method as recited in Claim 54, wherein each of the user interface elements  
2 comprises a data variable name, a user interface string value, and a data type value, and  
3 wherein the method further comprises the steps of:  
4 generating an electronic document that is displayable by an end user computer system  
5 that is communicatively coupled to the network device, wherein the electronic  
6 document includes the user interface string value;  
7 causing the network device to display the electronic document using the end user  
8 computer system;  
9 associating one of the configuration parameter values with the data variable name;  
10 and  
11 determining whether a data type of the one of the configuration parameter values  
12 matches the data type value.

1 65. A method of enabling a network service provider to customize a configuration of a  
2 network device, the method comprising the computer-implemented steps of:  
3 creating a partial configuration for a network device, wherein the partial configuration  
4 comprises a plurality of configuration commands, wherein each of one or  
5 more of the configuration commands is associated with one of a plurality of  
6 user interface elements;  
7 storing the partial configuration in the network device;  
8 providing the network device with the partial configuration to an end user, wherein  
9 setup of the network device causes the network device to perform the steps of  
10 parsing the partial configuration to identify the user interface elements;  
11 generating a user interface page based on the user interface elements;  
12 receiving one or more configuration parameter values via the user interface  
13 page; and substituting the configuration parameter values into the partial  
14 configuration to result in creating a complete configuration for the device; and  
15 receiving a configuration request from the device, based on the device operating  
16 according to the complete configuration.